



THE EIGHTH YEAR

As we begin the eighth year of the MPI program, we greet our newest class with several changes. For the first time in five years we have rethought and rearranged our Week I - Week II schedule to better serve both the Calculus and Physics courses, and allow us the flexibility to have special, longer enrichments from time to time with no disruption of classes. We are once again adopting a new Calculus book, the one used by the UMKC Mathematics Dept., since roughly a third of our students choose to attend UMKC each year. And lastly, the Calculus courses will have regular Mathematics Labs.

All students enrolled in Calculus will have access to a PC Lab of eight 386SX IBM-compatible computers installed with DERIVE, and Microcalc, two mathematics programs. [We are grateful to the UMKC Engineering Division for the sole use of these machines during our daily meeting times.] We will use two lab manuals, choosing appropriate labs from them and occasionally constructing our own lab exercises to be executed by students as an integral part of the course during regular class time. There will be lab reports to hand in, just as in Physics, and occasional writing assignments. We hope to enrich our teaching of Calculus with this software where appropriate, such as in developing visualization skills, and not to force it in where it is not appropriate, in this our first full-scale year-long experiment using the power of computer technology.

WELCOME TO THE MPI!

**STUDENT ORIENTATION
SEPT. 4 - 6, 1991**

Each year the first three days at the Institute are spent in giving our students an overview of how we operate, a discussion of our policies on attendance, grading, etc., and two diagnostic tests. Time is then set aside for the instructors to informally 'get to know' their classes before we all become preoccupied with class work.

In particular, on the first day, Sept. 4, 1991, we'll provide each student with a packet of information and have each of them fill out a personal data form. This last requires that all students bring with them the following information:

Social security number.

Daily schedule of high school classes.

Schedule of extracurricular activities.

High school counselor's name.

Car license number, make and model, for those ever planning to drive to the Institute.

Ideas for Enrichment Speaker topics.

Otherwise, we look forward to seeing our newest class on Wed. Sept. 4!

**THE 1991 MPI AWARDS PRESENTATION
AND
THE TOP 10 MPI STUDENTS OF 1990-91**

Our final awards presentation was held on May 17, 1991, during which we were pleased to present many

of our 1990-91 students with the following variety of awards:

Certificates for Outstanding Achievement (college grade of A or B) in:

CALCULUS I

(Name)	(School)
Brad Allen	Wm. Chrisman
Shalom Barber	Wm. Chrisman
Christopher Bird	Truman
Jared Coleman	Truman
Mark Crawford	Northeast
Nikki Elkins	Northeast
Paul Grutter	Truman
Anthony Hall	Van Horn
Sheri Harrison	Wm. Chrisman
Jeff Hoskins	Truman
Mary Noah	Wm. Chrisman
Erik Pratt	Wm. Chrisman
Raymond Rast	Wm. Chrisman
Matt Roberds	Truman
Jennifer Spungen	Truman
Khanh Tran	Northeast
Kendra VanTuyl	Wm. Chrisman
Don Wolfgeher	Truman

CALCULUS I and II

Jason Anderson	Wm. Chrisman
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PHYSICS

Jason Anderson	Wm. Chrisman
Shalom Barber	Wm. Chrisman
Christopher Bird	Truman
Mark Crawford	Northeast
Nikki Elkins	Northeast
Paul Grutter	Truman
Jeremy Hammond	Truman
Sheri Harrison	Wm. Chrisman
Jeff Hoskins	Truman
Raymond Rast	Wm. Chrisman
Matt Roberds	Truman
Jennifer Spungen	Truman
Khanh Tran	Northeast
Kendra VanTuyl	Wm. Chrisman

We also honored the TOP TEN students (ranked according to the mean of their full-year college calculus and physics grades) by

giving them a one year subscription to Scientific American magazine:

TOP 10 MPI STUDENTS 1990-91

1) Jeff Hoskins	Truman
2) Matt Roberds	Truman
3) Shalom Barber	Wm. Chrisman
4) Khanh Tran	Northeast
5) Mark Crawford	Northeast
6) Jason Anderson	Wm. Chrisman
7) Paul Grutter	Truman
8) Sheri Harrison	Wm. Chrisman
9) Kendra VanTuyl	Wm. Chrisman
10) Christopher Bird	Truman

Finally, we list here those MPI students planning to attend UMKC who received various scholarships from UMKC; included here are those students to whom the MPI awarded Chancellor's Scholarships:

UMKC Scholar Award Winners:

<u>Full Fees</u>	
Mark Crawford	Northeast

<u>One-half Fees</u>	
Sheri Harrison	Wm. Chrisman

UMKC Chancellors Award Winners:

Shalom Barber	Wm. Chrisman
Nikki Elkins	Northeast
Anthony Hall	Van Horn
Junior Salamasina	Ft. Osage
Troy Stogsdill	Ft. Osage

UM Curators Award Winners:

Christopher Bird	Truman
Jeff Hoskins	Truman
Jacquelynnne Morris	Van Horn
Mary Noah	Wm. Chrisman
Matt Roberds	Truman
Mike Steadman	Ft. Osage

ADVICE TO THE STUDENTS OF YEAR 8
FROM THE STUDENTS OF YEAR 7

At the end of this last year, in May, we decided to have our

students write however much they wanted in answer to the question:

"What ADVICE would you give to incoming students about study, attitude, or any other aspect of surviving the MPI in 1991-92?"

We were surprised and pleased at how seriously and with what maturity they wrote. In fact, we were so impressed that this year each incoming student, after a few weeks of class, will receive a complete set of these words of advice from the 37 students of Year 7 (eight typewritten pages in all!). Here are four excerpts from that document:

"Whatever you may be thinking, stop it! It's a different experience here: fun, scary, and full of anxiety, all at the same time.

Don't change your philosophy for life because of MPI; it's not a life or death type of thing. Just be prepared to pick at the face a little.

You'll survive, no problem, but work at it, or you'll hate yourself all year for taking such a God-awful hard class your senior year. It really isn't that way; take it in stride and you'll find that out!"

Erik Pratt

"I would say to not worry about the first month, and to not judge how the rest of the year will be from that. I would do it over again. I believe it was a worthwhile experience (though it was difficult).

I would start out studying all of the time to get used to it. Try reading and working out problems a few days ahead. Don't think you can catch up or you can cram for the test the night before. It doesn't help, you only get behind.

Don't judge how you will do for the rest of the year from the first few tests.

Make an effort to talk to students from other schools. Get to know them, a lot of times they can help you out."

Holly Buxter

"Don't come in with a nonchalant attitude. Come in determined to work hard and do it. It is hard and it takes self-discipline, but it's worth it. As I know too too well from experience, don't get behind. Do the problems as they are assigned, at least do some from each section if not all of them. Doing them in your problem solving groups is good, but there is no replacement for doing them on your own. Take it serious and don't think that it is like your previous high school classes, it's not. It's not that hard if you study and keep up, but if you don't it is. It will be a challenge, but that's good. I know all this from experience. It has been enjoyable (most of the time)."

Troy Stogsdill

"Don't fall behind. Actually do some of the suggested homework. Don't wait until the last minute to study. Have a positive attitude and keep the faith."

Nikki Elkins

THE 1991-92 CLASS (TO DATE)

Section A

Jeff Adams	Wm. Chrisman
Kelley Banks	Truman
Jennifer Barnes	Van Horn
Jon Bradshaw	Van Horn
Jeremy Briner	Wm. Chrisman
Nathan Carter	Ft. Osage
Sean Clyma	Wm. Chrisman
Christina Echavarria	Northeast

Section A (cont.)

Leslie Farrow	Wm. Chrisman
Justin Heather	Wm. Chrisman
Scott Hummel	Ft. Osage
Rorn Im	Northeast
Scott Jones	Ft. Osage
Kristi Lynn	Van Horn
John McCarty	Truman
Shonn Montavy	Ft. Osage
Nha Truc Nguyen	Northeast
Russell Price	Van Horn
Brian Segebart	Van Horn
Latonya Slaughter	Northeast
Lisa Tompkins	Wm. Chrisman
Thuy Tran	Northeast

Section B

Kim Burton	Wm. Chrisman
Todd Carter	Truman
Kenyonia Coleman	Van Horn
Curtis Cowan	Wm. Chrisman
Joe Cramer	Ft. Osage
Laura Dilley	Wm. Chrisman
Richard Gross, Jr.	Van Horn
Veronica Hooker	Northeast
Brian Huss	Truman
Chris Keene	Ft. Osage
Candace Lindsey	Northeast
Desmond McGuire	Northeast
Janelle McRae	Van Horn
Vic Medina	Wm. Chrisman
Michael Otero	Northeast
Roman Puno	Van Horn
Christina Rippy	Northeast
David Smith	Ft. Osage
Melissa Smith	Northeast
Jason VanNatta	Ft. Osage
Kim Vo Loan	Northeast
Chad Wainwright	Ft. Osage
Kristin Weber	Wm. Chrisman

Section C
(Calculus I and II)

Rodney Caudle	Wm. Chrisman
Gary Cauthan	Ft. Osage
Yan Pei Chao	Wm. Chrisman
Chris Gross	Ft. Osage
Patrick Hayden	Truman
Mike Johnson	Wm. Chrisman
Mark Matson	Wm. Chrisman
Jerry Morton	Truman
Tim Parker	Truman
Tony Prettejohn	Truman

Robert Ramirez	Wm. Chrisman
Jeffrey Schreiner	Truman
Sonya Smith	Truman

Section D

Brenda Bunch	Wm. Chrisman
Janette Bushakra	Wm. Chrisman
Anna Butler	Northeast
Juan Clay	Van Horn
Pat Cuezze	Truman
Kristen Evans	Ft. Osage
Brandy Gann	Wm. Chrisman
Jimi Gentry	Van Horn
Lorain Gosling	Truman
Erik Hansen	Van Horn
Kari Jones	Wm. Chrisman
Kim Lovitch	Ft. Osage
Chheng Ly Meng	Northeast
Jason Myers	Ft. Osage
Son Nguyen	Northeast
Mike Nodwell	Van Horn
Jerome Parris	Northeast
Corey Peak	Wm. Chrisman
Heather Siebenmorgen	Ft. Osage
Troy Stanton	Wm. Chrisman
David Young	Wm. Chrisman

These are the total of 79 students (as of this newsletter) who will be enrolled. As usual there will be additions and deletions through September.

THE 1991-92 STAFF

Our staff once again includes those high school teacher veterans of the past seven years:

In Physics:

Larry Harding from Fort Osage,
Calvin Nelson from Northeast,

and, in Calculus:

Sheri Adams from Truman,
Joe Kaifes from Van Horn, and
Al Morse from Wm. Chrisman,

while our University staff is listed in the heading of this newsletter. We should also mention our half-time secretary and assistant Doris Kirst.

PREVIOUS ENRICHMENTS

When Mike See, an engineer from Mission Operations at NASA visited the MPI on April 3, he gave an detailed discussion of the proposed orbital space station FREEDOM, including current slides and sketches. He also played one of a series of video-tapes, the one in which he took part, featuring Jaime Escalante, the well-known Hispanic mathematics teacher profiled in the movie 'Stand and Deliver'. The video-tape series is designed to encourage younger students to continue in mathematics, and the sample we saw was definitely a hit with our students.

UPCOMING ENRICHMENTS

One of the special features of the Institute is its biweekly enrichment series, in which on alternate Fridays either professionals in the sciences, engineering, mathematics, etc., speak to our MPI students, or, we have a field trip to such places as the nuclear research reactor in Columbia, various science exhibits, or Worlds of Fun for some 'hands on' physics.

The October 1 newsletter will report on those speakers scheduled for October and beyond. But as part of our first three days of orientation, Jan Longhorn of UMKC, will speak on Friday, Sept. 6 about college admissions in general, and the importance of thinking about applications EARLY. (This is not intended to be a recruitment for UMKC, but a general discussion to help sensitize our students to the importance for colleges of deadlines.)

During the first two weeks of classes at the MPI we will also spend two days discussing four topics which we have come to believe are vital study and college survival skills

that are too often not directly addressed. Specifically, these are: NOTE-TAKING, TEST-TAKING, READING A TEXTBOOK, and lastly, and perhaps most importantly, TIME MANAGEMENT. These sessions will be jointly presented by David Arendale from UMKC's Academic Support Services, and the MPI mathematics coordinator.

TO THE PARENTS OF THE 1991-92 CLASS AT THE INSTITUTE

[Reprinted in part from the August 1, 1987 newsletter.]

This newsletter is written for YOUR information, and there will be one sent to you every two months during this year while your son or daughter is at the Institute.

We firmly believe that without your support and concern at home students cannot succeed in such a rigorous program as the MPI. Our classes are NOT high schools classes, and require both study skills and a commitment that students still in high school, however talented, have not experienced before. In both of these areas YOU as parents can be of enormous help.

One of the first facts we have learned to face in the last seven years is that many bright students never learn to study efficiently; they have often gotten along very well with a 'wait and cram' attitude, giving textbooks only an occasional cursory look in time for testing, and relying on their innate ability to absorb information and skills in the classroom. However, in coming to the Institute these same students always find themselves at first, and suddenly, falling behind.

In general, in college classes MORE MATERIAL is covered, and MORE SKILL with concepts is required, i.e., THINKING is expected regularly. This comes as a shock to many talented students. One of the

Institute's goals is to expose students to this shock, and help them overcome it by learning effective study skills in actual practice. But YOU as parents can help this transition enormously, by suggesting that your children actually spend the minimum of one hour per subject, per night of study that we here at the MPI urge. They must come to realize that longer study times reflect the new rigor of the COURSES, not their lack of talent. This is a point of view that many students find hard to accept at first. Your encouragement can help them over this hump. Encourage them to seek the help of all the teachers involved in the program, and to put aside the false idea that only remedial students need to TALK about mathematics and physics. The fact is that true understanding comes only from learning to discuss and explain a subject, and this is ESPECIALLY SO in physics and mathematics.

Finally, we urge you to call us if you ever have a question, and we hope that you will find time to visit the Institute during our annual OPEN HOUSE on Sunday afternoon, November 3, 1991. (More about this in the October newsletter.)

PAST STUDENTS WRITE TO US

TRACEY STERBENZ (89-90)
(Mathematics Education Major)

"Study everything; do the problems even if they don't have to be turned in; if you don't get it at first, keep trying -- the MPI is an experience that will not only help you learn, but make new friends too."

MATHEMATICS AWARENESS WEEK 1991

TEACHER COMMENTS

The MPI observed national Mathematics Awareness Week, April 21-27 this year by coaching and sending

teams of three students to give 30 minute presentations to nine grade 7 and 8 classes at six different junior high and middle schools. Here are some comments from the teachers of those classes:

"The students were well-prepared for the demonstrations performed for the class. My class responded to the students and were quite attentive. I felt the students did an excellent job of discussing material that my students felt they knew and then moving into an extension of the material covered in future classes. [They] did a good job explaining the math curriculum at the high school. This group of students was funny and did an excellent job entertaining! Thank you for the opportunity to be a part of this new program."

Mindy Shields
Palmer Junior High

"The students did a good job. They were organized and seemed enthusiastic about what they were doing. Varied topics were discussed showing many branches of math. My students learned a lot and really enjoyed the presentation. Would like to see this again next year. Thanks!"

Karen Bogard
Bridger Junior High

"Very refreshing and energetic students. The idea is a good one. The best part of the presentation was a question/answer portion about courses to take to prepare for college. My students really listened to the student's suggestions. Coming from their peers, the suggestions were accepted more readily than when they come from me."

June Langley
Ft. Osage Junior High

"The presentation was done well. All three students did a very good job being in front of the middle school students. It would have been nice if there would have been time for questions and more hands-on activities. Thank you!"

Diana Ackley
Northeast Middle School

"I liked the info selected for presentation. The paper activities kept the student's interests. Thanks for coming into my classroom. You're most welcome to come again!"

Jane Ray
Nowlin Middle School

"The trio who visited my class did a good job. They held the class's interest and, I believe, inspired them somewhat. They presented themselves well and are a credit to your program. I wish them well in their college endeavors."

Barbara Sotta
Nowlin Middle School

"My students really enjoyed the presentation. So did I. The enthusiasm the presenters showed toward math was good for the class to see. I hope the program continues."

Sam Brock
Bridger Junior High

**A SOLUTION TO
MATHEMATICS CHALLENGE #18**

Recall the problem statement:

The cook believes that at least one of the two is mad. What can you deduce about the cook and the cat?

(In this world, everyone is either sane or mad. Sane people are 100% correct in their beliefs; what they believe true IS true, and what they believe false IS false. Likewise, mad people are 100% wrong in their beliefs.)

SOLUTION:

If the cook were mad, then it would be TRUE that at least one of the two is mad, and we would have a mad person (the cook) holding a true belief, which is not possible in this world. Therefore the cook must be sane.

Since the cook is sane, her belief is correct, hence one of the two really is mad. Since it is not the cook, it must be the cat.

So, the cook is sane and the cat is mad.

[From: Alice in Puzzle-Land, by Raymond Smullyan.]

**A SOLUTION TO
PHYSICS CHALLENGE #9**

Recall the problem statement:

If you lock the brakes on your car while moving at high speed on a wet road, the car will act like an aquaplane. That is, the tires will skim along on a thin sheet of water and will not actually touch the road.

Why does this happen, and why doesn't it always happen on wet roads even when the brakes are NOT applied? Is there any tread design that will minimize this effect?

SOLUTION:

There are several tire designs currently used to decrease the probability of aquaplaning: The tread can channel the water at the rear of the contact area outward and eject it; other, shorter channels can eject water to the sides; finally, small holes in the tire can essentially blot up a water layer as they make contact with the road in the front part of the contact area. In each of these techniques the emphasis is on removing the water quickly to avoid aquaplaning.

MATHEMATICS CHALLENGE #19

If $n > 2$ is a positive integer, PROVE that in the sequence

$$\frac{1}{n}, \frac{2}{n}, \frac{3}{n}, \dots, \frac{(n-1)}{n},$$

an EVEN number of members of the sequence are fractions in lowest terms (meaning, the only positive divisor of both the top and bottom is 1).

[From: Mathematical Quickies, by Charles W. Trigg.]

PHYSICS CHALLENGE #10

Pitchers sometimes threw Babe Ruth slow balls because they thought it would be harder for him to hit a home run if the ball were moving slower when struck. Does this belief have any physical basis?

[From: The Flying Circus of Physics, by Jearl Walker.]

MPI T-SHIRTS

Beginning in about October, we will once again be selling bright blue MPI T-shirts and sweatshirts to our students. These shirts have a classy 3D graph ($z = \cos x \cdot \sin y$) on the back and our student-designed MPI logo on the left front.

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The MPI Newsletter is published five times a year on the first of the month during the months of August, October, December, February, and April at The Mathematics and Physics Institute, 600 W. Mechanic, Independence, MO 64050, phone (816) 235-1272. Please address all correspondence concerning this newsletter to 'MPI Newsletter'.
